



ACOUSTICAL SOCIETY OF AMERICA

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Acoustical Society of America

Position on the Use of Sound Amplification in the Classroom

Introduction

In recognizing the importance of good speech communication to classroom learning, the American National Standards Institute (ANSI) Accredited Standards Committee S12, Noise, which is administered by the Acoustical Society of America, developed a standard for classroom acoustics, ANSI S12.60-2002. The standard specifies the acoustical conditions needed to achieve acceptable speech intelligibility for teachers and students in mainstream classrooms. The standard specifies maximum sound levels (35 dB, A weighted) for unoccupied classrooms, maximum reverberation times (0.6 s), and minimum sound insulation requirements between classrooms and adjacent spaces.

Channels of Communication

There are three channels for speech communication in classrooms: (1) student to student, (2) student to teacher, and (3) teacher to student. Sound amplification only improves the 3rd channel, if at all. If the room is too reverberant (maximum reverberation time exceeds 0.6 s), then sound amplification does nothing to improve communication; it only increases the sound level. Sound amplification does little to improve and may worsen the first two channels of communication, student to student and student to teacher. Sound amplification refers to any method that acoustically amplifies sound.

Low Background Sound Levels Ensure High Speech Intelligibility

To achieve the high speech intelligibility needed for effective learning, speech sound levels must exceed background sound levels by at least 15 decibels (15 dB Signal to Noise Ratio [SNR]). Background sound levels of 35 dB or less ensure the 15 dB SNR needed for effective learning. While sound amplification can improve speech intelligibility if the room is not too reverberant, recent data suggest that personal communication systems (e.g., FM systems) for hearing impaired students provide much better speech intelligibility than sound amplification systems; FM systems are largely immune to reverberation.

Acoustical Society of America Position on Sound Amplification in Classrooms

For these reasons and the additional reasons outlined below, the Acoustical Society of America takes the position, in agreement with ANSI S12.60-2002, that:

SOUND AMPLIFICATION SHOULD NOT BE ROUTINELY EMPLOYED IN TYPICAL SMALL MAINSTREAM CLASSROOMS.

And

ALL NEW OR RENOVATED SMALL MAINSTREAM CLASSROOMS SHOULD BE DESIGNED TO CONFORM WITH ANSI S12.60-2002 TO ENSURE SATISFACTORY SPEECH COMMUNICATION FOR LEARNING.

Additional Reasons Why Sound Amplification Should NOT be Routinely Employed in Classrooms

- 1) Sound amplification increases rather than reduces overall classroom sound levels. Such increased sound levels may be excessive for comfortable listening. Also, unless classroom walls, ceilings, and floors are acoustically upgraded to improve their sound insulation, amplified sound may be heard in adjacent classrooms, interfering with learning there.

- 2) Sound amplification systems require regular maintenance and user training. Improperly maintained microphones and loudspeakers or poor user skills can cause even poorer speech communication than no amplification system. Good classroom acoustics can be achieved passively with good architectural design practice. Good classroom acoustics in existing schools CAN usually be achieved through renovation. Unlike amplification, good acoustics that are “built in” to the classroom require little or no maintenance or user training.